

PCT

RAW SEQUENCE LISTING
 PATENT APPLICATION: US/09/674,824

DATE: 05/08/2001
 TIME: 11:54:19

Input Set : A:\ES.txt
 Output Set: N:\CRF3\05082001\I674824.raw

ENTERED

3 <110> APPLICANT: Lorz, et al
 5 <120> TITLE OF INVENTION: NUCLEIC ACID MOLECULES WHICH CODE FOR ENZYMES DERIVED FROM WHEAT AND
 6 WHICH ARE INVOLVED IN THE SYNTHESIS OF STARCH
 8 <130> FILE REFERENCE: AGR 1998/M 205/ FLH514413-3848
 10 <140> CURRENT APPLICATION NUMBER: 09/674,824
 C--> 11 <141> CURRENT FILING DATE: 2000-02-16
 13 <150> PRIOR APPLICATION NUMBER: PCT/EP99/03156
 14 <151> PRIOR FILING DATE: 1999-05-07
 16 <150> PRIOR APPLICATION NUMBER: DE 198 20607.0
 17 <151> PRIOR FILING DATE: 1998-05-08
 19 <160> NUMBER OF SEQ ID NOS: 6
 21 <170> SOFTWARE: PatentIn version 3.0
 23 <210> SEQ ID NO: 1
 24 <211> LENGTH: 2771
 25 <212> TYPE: DNA
 26 <213> ORGANISM: Triticum aestivum
 28 <220> FEATURE:
 29 <221> NAME/KEY: CDS
 30 <222> LOCATION: (280)..(2547)
 32 <400> SEQUENCE: 1
 33 cgccactcca ctgccttgc cccactccca ctcttctctc cccgcgcaca ccgagtcggc 60
 35 accggctcat caccatcac ctgcgcctcg gccaccggca aacccccga tccgcttttg 120
 37 caggcagcgc actaaaaccc cggggagcgc gccccgcggc agcagcagca ccgcagtggg 180
 39 agagagaggc ttgcgcccg cccgcaccga gcggggcgat ccaccgtccg tgcgtccgca 240
 41 cctcctccgc ctctccctt gtcccgcgcg cccacaccc atg gcg gcg acg ggc 294
 42 Met Ala Ala Thr Gly
 43 1 5
 45 gtc ggc gcc ggg tgc ctc gcc ccc agc gtc cgc ctg cgc gcc gat ccg 342
 46 Val Gly Ala Gly Cys Leu Ala Pro Ser Val Arg Leu Arg Ala Asp Pro
 47 10 15 20
 49 gcg acg gcg gcc cgg gcg tcc gcc tgc gtc gtc cgc gcg cgg ctc cgg 390
 50 Ala Thr Ala Ala Arg Ala Ser Ala Cys Val Val Arg Ala Arg Leu Arg
 51 25 30 35
 53 cgc ttg gcg cgg ggc cgc tac gtc gcc gag ctc agc agg gag ggc ccc 438
 54 Arg Leu Ala Arg Gly Arg Tyr Val Ala Glu Leu Ser Arg Glu Gly Pro
 55 40 45 50
 57 gcg gcg cgc ccc gcg cag cag cag caa ctg gcc ccg ccg ctc gtg cca 486
 58 Ala Ala Arg Pro Ala Gln Gln Gln Gln Leu Ala Pro Pro Leu Val Pro
 59 55 60 65
 61 ggc ttc ctc gcg ccg ccg ccc gcg ccc gcc cag tgc ccg gcc ccg 534
 62 Gly Phe Leu Ala Pro Pro Pro Ala Pro Ala Gln Ser Pro Ala Pro
 63 70 75 80 85
 65 acg cag ccg ccc ctg ccg gac gcc ggc gtg ggg gaa ctc gcg ccc gac 582
 66 Thr Gln Pro Pro Leu Pro Asp Ala Gly Val Gly Glu Leu Ala Pro Asp
 67 90 95 100
 69 ctc ctg ctc gaa ggg att gct gag gat tcc atc gac agc ata att gtg 630
 70 Leu Leu Leu Glu Gly Ile Ala Glu Asp Ser Ile Asp Ser Ile Ile Val

RAW SEQUENCE LISTING

DATE: 05/08/2001

PATENT APPLICATION: US/09/674,824

TIME: 11:54:19

Input Set : A:\ES.txt

Output Set: N:\CRF3\05082001\I674824.raw

71	105	110	115	
73	gct gca agt gag cag gat tct gag atc atg gat gcg aat gag caa cct	678		
74	Ala Ala Ser Glu Gln Asp Ser Glu Ile Met Asp Ala Asn Glu Gln Pro			
75	120 125 130			
77	caa gct aaa gtt aca cgt agc atc gtg ttt gtg act ggt gaa gct gct	726		
78	Gln Ala Lys Val Thr Arg Ser Ile Val Phe Val Thr Gly Glu Ala Ala			
79	135 140 145			
81	cct tat gca aag tca ggg ggg ttg gga gat gtt tgt ggt tgc tta cca	774		
82	Pro Tyr Ala Lys Ser Gly Gly Leu Gly Asp Val Cys Gly Ser Leu Pro			
83	150 155 160 165			
85	att gct ctt gct gct cgt ggt cac cga gtg atg gtt gta atg cca aga	822		
86	Ile Ala Leu Ala Ala Arg Gly His Arg Val Met Val Val Met Pro Arg			
87	170 175 180			
89	tac tta aat ggg tcc tct gat aaa aac tat gca aag gca tta tac act	870		
90	Tyr Leu Asn Gly Ser Ser Asp Lys Asn Tyr Ala Lys Ala Leu Tyr Thr			
91	185 190 195			
93	gcg aag cac att aag att cca tgc ttt ggg gga tca cat gaa gtg acc	918		
94	Ala Lys His Ile Lys Ile Pro Cys Phe Gly Gly Ser His Glu Val Thr			
95	200 205 210			
97	ttt ttt cat gat tat aga gac aac gtc gat tgg gtg ttt gtc gat cat	966		
98	Phe Phe His Glu Tyr Arg Asp Asn Val Asp Trp Val Phe Val Asp His			
99	215 220 225			
101	ccg tca tat cac aga cca gga agt tta tat gga gat aat ttt ggt gct	1014		
102	Pro Ser Tyr His Arg Pro Gly Ser Leu Tyr Gly Asp Asn Phe Gly Ala			
103	230 235 240 245			
105	ttt ggt gat aat cag ttc aga tac aca ctc ctt tgc tat gct gca tgc	1062		
106	Phe Gly Asp Asn Gln Phe Arg Tyr Thr Leu Leu Cys Tyr Ala Ala Cys			
107	250 255 260			
109	gag gcc cca cta atc ctt gaa ttg gga gga tat att tat gga cag aat	1110		
110	Glu Ala Pro Leu Ile Leu Glu Leu Gly Gly Tyr Ile Tyr Gly Gln Asn			
111	265 270 275			
113	tgc atg ttt gtt gtg aac gat tgg cat gcc agc ctt gtg cca gtc ctt	1158		
114	Cys Met Phe Val Val Asn Asp Trp His Ala Ser Leu Val Pro Val Leu			
115	280 285 290			
117	ctt gct gca aaa tat aga cca tac ggt gtt tac aga gat tcc cgc agc	1206		
118	Leu Ala Ala Lys Tyr Arg Pro Tyr Gly Val Tyr Arg Asp Ser Arg Ser			
119	295 300 305			
121	acc ctt gtt ata cat aat tta gca cat cag ggt gtg gag cct gca agt	1254		
122	Thr Leu Val Ile His Asn Leu Ala His Gln Gly Val Glu Pro Ala Ser			
123	310 315 320 325			
125	aca tat cct gat ctg gga ttg cct cct gaa tgg tat gga gct tta gaa	1302		
126	Thr Tyr Pro Asp Leu Gly Leu Pro Pro Glu Trp Tyr Gly Ala Leu Glu			
127	330 335 340			
129	tgg gta ttt cca gaa tgg gca agg agg cat gcc ctt gac aag ggt gag	1350		
130	Trp Val Phe Pro Glu Trp Ala Arg Arg His Ala Leu Asp Lys Gly Glu			
131	345 350 355			
133	gca gtt aac ttt ttg aaa gga gca gtt gtg aca gca gat cgg att gtg	1398		
134	Ala Val Asn Phe Leu Lys Gly Ala Val Val Thr Ala Asp Arg Ile Val			
135	360 365 370			

RAW SEQUENCE LISTING

DATE: 05/08/2001

PATENT APPLICATION: US/09/674,824

TIME: 11:54:19

Input Set : A:\ES.txt

Output Set: N:\CRF3\05082001\I674824.raw

137	acc	gtc	agt	cag	ggt	tat	tca	tgg	gag	gtc	aca	act	gct	gaa	ggt	gga	1446
138	Thr	Val	Ser	Gln	Gly	Tyr	Ser	Trp	Glu	Val	Thr	Thr	Ala	Glu	Gly	Gly	
139		375					380					385					
141	cag	ggc	ctc	aat	gag	ctc	tta	agc	tcc	cga	aaa	agt	gta	ttg	aat	gga	1494
142	Gln	Gly	Leu	Asn	Glu	Leu	Leu	Ser	Ser	Arg	Lys	Ser	Val	Leu	Asn	Gly	
143	390					395					400					405	
145	att	gta	aat	gga	att	gac	att	aat	gat	tgg	aac	ccc	acc	aca	gac	aag	1542
146	Ile	Val	Asn	Gly	Ile	Asp	Ile	Asn	Asp	Trp	Asn	Pro	Thr	Thr	Asp	Lys	
147					410					415					420		
149	tgt	ctc	cct	cat	cat	tat	tct	gtc	gat	gac	ctc	tct	gga	aag	gcc	aaa	1590
150	Cys	Leu	Pro	His	His	Tyr	Ser	Val	Asp	Asp	Leu	Ser	Gly	Lys	Ala	Lys	
151				425						430					435		
153	tgt	aaa	gct	gaa	ttg	cag	aag	gag	ttg	ggt	tta	cct	gta	agg	gag	gat	1638
154	Cys	Lys	Ala	Glu	Leu	Gln	Lys	Glu	Leu	Gly	Leu	Pro	Val	Arg	Glu	Asp	
155		440						445					450				
157	ggt	cct	ctg	att	ggc	ttt	att	gga	aga	ctg	gat	tac	cag	aaa	ggc	att	1686
158	Val	Pro	Leu	Ile	Gly	Phe	Ile	Gly	Arg	Leu	Asp	Tyr	Gln	Lys	Gly	Ile	
159		455				460					465						
161	gat	ctc	att	aaa	atg	gcc	att	cca	gag	ctc	atg	agg	gag	gac	gtg	caa	1734
162	Asp	Leu	Ile	Lys	Met	Ala	Ile	Pro	Glu	Leu	Met	Arg	Glu	Asp	Val	Gln	
163	470					475					480					485	
165	ttt	gtc	atg	ctt	gga	tct	ggg	gat	cca	att	ttt	gaa	ggc	tgg	atg	aga	1782
166	Phe	Val	Met	Leu	Gly	Ser	Gly	Asp	Pro	Ile	Phe	Glu	Gly	Trp	Met	Arg	
167				490						495					500		
169	tct	acc	gag	tcg	agt	tac	aag	gat	aaa	ttc	cgt	gga	tgg	gtt	gga	ttt	1830
170	Ser	Thr	Glu	Ser	Ser	Tyr	Lys	Asp	Lys	Phe	Arg	Gly	Trp	Val	Gly	Phe	
171				505					510						515		
173	agt	gtt	cca	gtt	tcc	cac	aga	ata	act	gca	ggt	tgc	gat	ata	ttg	tta	1878
174	Ser	Val	Pro	Val	Ser	His	Arg	Ile	Thr	Ala	Gly	Cys	Asp	Ile	Leu	Leu	
175		520						525					530				
177	atg	cca	tcg	aga	ttt	gaa	cct	tgc	ggt	ctt	aat	cag	cta	tat	gct	atg	1926
178	Met	Pro	Ser	Arg	Phe	Glu	Pro	Cys	Gly	Leu	Asn	Gln	Leu	Tyr	Ala	Met	
179		535					540						545				
181	caa	tat	ggt	aca	gtt	cct	gta	gtt	cat	gga	act	ggg	ggc	ctc	cga	gac	1974
182	Gln	Tyr	Gly	Thr	Val	Pro	Val	Val	His	Gly	Thr	Gly	Gly	Leu	Arg	Asp	
183	550					555					560					565	
185	aca	gtc	gag	acc	ttc	aac	cct	ttt	ggt	gca	aaa	gga	gag	gag	ggt	aca	2022
186	Thr	Val	Glu	Thr	Phe	Asn	Pro	Phe	Gly	Ala	Lys	Gly	Glu	Glu	Gly	Thr	
187				570							575					580	
189	ggg	tgg	gcg	ttc	tca	ccg	cta	acc	gtg	gac	aag	atg	ttg	tgg	gca	ttg	2070
190	Gly	Trp	Ala	Phe	Ser	Pro	Leu	Thr	Val	Asp	Lys	Met	Leu	Trp	Ala	Leu	
191				585						590						595	
193	cga	acc	gcg	atg	tcg	aca	ttc	agg	gag	cac	aag	ccg	tcc	tgg	gag	ggg	2118
194	Arg	Thr	Ala	Met	Ser	Thr	Phe	Arg	Glu	His	Lys	Pro	Ser	Trp	Glu	Gly	
195		600								605						610	
197	ctc	atg	aag	cga	ggc	atg	acg	aaa	gac	cat	acg	tgg	gac	cat	gcc	ccg	2166
198	Leu	Met	Lys	Arg	Gly	Met	Thr	Lys	Asp	His	Thr	Trp	Asp	His	Ala	Pro	
199		615					620									625	
201	agc	agt	acg	agc	aga	tct	tcg	agt	ggg	cct	tcg	tgg	acc	aac	cct	acg	2214

RAW SEQUENCE LISTING DATE: 05/08/2001
 PATENT APPLICATION: US/09/674,824 TIME: 11:54:19

Input Set : A:\ES.txt
 Output Set: N:\CRF3\05082001\I674824.raw

```

202 Ser Ser Thr Ser Arg Ser Ser Ser Gly Pro Ser Trp Thr Asn Pro Thr
203 630                               635                               640                               645
205 tca tgt aga cgg gga ctg ggg agg tcc aag tgc gag tct cct tca gct      2262
206 Ser Cys Arg Arg Gly Leu Gly Arg Ser Lys Cys Glu Ser Pro Ser Ala
207                               650                               655                               660
209 ctg aag aca tcc tct tca tcc ttc cgc ggc ccg gaa gga tac ccc tgt      2310
210 Leu Lys Thr Ser Ser Ser Ser Phe Arg Gly Pro Glu Gly Tyr Pro Cys
211                               665                               670                               675
213 aca ttg cgt tgt cct gct aca gta gag tcg caa tgc gcc tgc ttg ctt      2358
214 Thr Leu Arg Cys Pro Ala Thr Val Glu Ser Gln Cys Ala Cys Leu Leu
215                               680                               685                               690
217 tgg ttc gcc ggt tcg aga aca tat gac ggc tgt gct gct gcg gcg gtg      2406
218 Trp Phe Ala Gly Ser Arg Thr Tyr Asp Gly Cys Ala Ala Ala Val
219                               695                               700                               705
221 aca gct tcg ggt gga cga cag tta cag ttt tgg gga ata agg aag gga      2454
222 Thr Ala Ser Gly Gly Arg Gln Leu Gln Phe Trp Gly Ile Arg Lys Gly
223 710                               715                               720                               725
225 tgt gct gca gga tgg tta aca gca aag cac cac tca gat ggc agc ctc      2502
226 Cys Ala Ala Gly Trp Leu Thr Ala Lys His His Ser Asp Gly Ser Leu
227                               730                               735                               740
229 tct gtc cgt gtt aca gct gaa atc aga aac caa ctg gtg act ctt      2547
230 Ser Val Arg Val Thr Ala Glu Ile Arg Asn Gln Leu Val Thr Leu
231                               745                               750                               755
233 tagccttagt gattgtgaag tttgttgctt tctgtgtatg ttgtcttgct cttagctgac      2607
235 aaatatttga cctgttgagg aatttttatct ttgctgctgt ttttttttaa tcaaaagagg      2667
237 ggttttcctc cgatttcatt aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa      2727
239 aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaa      2771
242 <210> SEQ ID NO: 2
243 <211> LENGTH: 756
244 <212> TYPE: PRT
245 <213> ORGANISM: Triticum aestivum
247 <400> SEQUENCE: 2
249 Met Ala Ala Thr Gly Val Gly Ala Gly Cys Leu Ala Pro Ser Val Arg
250 1                               5                               10                               15
253 Leu Arg Ala Asp Pro Ala Thr Ala Ala Arg Ala Ser Ala Cys Val Val
254                               20                               25                               30
257 Arg Ala Arg Leu Arg Arg Leu Ala Arg Gly Arg Tyr Val Ala Glu Leu
258                               35                               40                               45
261 Ser Arg Glu Gly Pro Ala Ala Arg Pro Ala Gln Gln Gln Leu Ala
262                               50                               55                               60
265 Pro Pro Leu Val Pro Gly Phe Leu Ala Pro Pro Pro Pro Ala Pro Ala
266 65                               70                               75                               80
269 Gln Ser Pro Ala Pro Thr Gln Pro Pro Leu Pro Asp Ala Gly Val Gly
270                               85                               90                               95
273 Glu Leu Ala Pro Asp Leu Leu Leu Glu Gly Ile Ala Glu Asp Ser Ile
274                               100                              105                              110
277 Asp Ser Ile Ile Val Ala Ala Ser Glu Gln Asp Ser Glu Ile Met Asp
278                               115                              120                              125
281 Ala Asn Glu Gln Pro Gln Ala Lys Val Thr Arg Ser Ile Val Phe Val

```

RAW SEQUENCE LISTING

DATE: 05/08/2001

PATENT APPLICATION: US/09/674,824

TIME: 11:54:19

Input Set : A:\ES.txt

Output Set: N:\CRF3\05082001\I674824.raw

```

282      130      135      140
285 Thr Gly Glu Ala Ala Pro Tyr Ala Lys Ser Gly Gly Leu Gly Asp Val
286 145      150      155      160
289 Cys Gly Ser Leu Pro Ile Ala Leu Ala Ala Arg Gly His Arg Val Met
290      165      170      175
293 Val Val Met Pro Arg Tyr Leu Asn Gly Ser Ser Asp Lys Asn Tyr Ala
294      180      185      190
297 Lys Ala Leu Tyr Thr Ala Lys His Ile Lys Ile Pro Cys Phe Gly Gly
298      195      200      205
301 Ser His Glu Val Thr Phe Phe His Glu Tyr Arg Asp Asn Val Asp Trp
302      210      215      220
305 Val Phe Val Asp His Pro Ser Tyr His Arg Pro Gly Ser Leu Tyr Gly
306 225      230      235      240
309 Asp Asn Phe Gly Ala Phe Gly Asp Asn Gln Phe Arg Tyr Thr Leu Leu
310      245      250      255
313 Cys Tyr Ala Ala Cys Glu Ala Pro Leu Ile Leu Glu Leu Gly Gly Tyr
314      260      265      270
317 Ile Tyr Gly Gln Asn Cys Met Phe Val Val Asn Asp Trp His Ala Ser
318      275      280      285
321 Leu Val Pro Val Leu Leu Ala Ala Lys Tyr Arg Pro Tyr Gly Val Tyr
322      290      295      300
325 Arg Asp Ser Arg Ser Thr Leu Val Ile His Asn Leu Ala His Gln Gly
326 305      310      315      320
329 Val Glu Pro Ala Ser Thr Tyr Pro Asp Leu Gly Leu Pro Pro Glu Trp
330      325      330      335
333 Tyr Gly Ala Leu Glu Trp Val Phe Pro Glu Trp Ala Arg Arg His Ala
334      340      345      350
337 Leu Asp Lys Gly Glu Ala Val Asn Phe Leu Lys Gly Ala Val Val Thr
338      355      360      365
341 Ala Asp Arg Ile Val Thr Val Ser Gln Gly Tyr Ser Trp Glu Val Thr
342      370      375      380
345 Thr Ala Glu Gly Gly Gln Gly Leu Asn Glu Leu Ser Ser Arg Lys
346 385      390      395      400
349 Ser Val Leu Asn Gly Ile Val Asn Gly Ile Asp Ile Asn Asp Trp Asn
350      405      410      415
353 Pro Thr Thr Asp Lys Cys Leu Pro His His Tyr Ser Val Asp Asp Leu
354      420      425      430
357 Ser Gly Lys Ala Lys Cys Lys Ala Glu Leu Gln Lys Glu Leu Gly Leu
358      435      440      445
361 Pro Val Arg Glu Asp Val Pro Leu Ile Gly Phe Ile Gly Arg Leu Asp
362      450      455      460
365 Tyr Gln Lys Gly Ile Asp Leu Ile Lys Met Ala Ile Pro Glu Leu Met
366 465      470      475      480
369 Arg Glu Asp Val Gln Phe Val Met Leu Gly Ser Gly Asp Pro Ile Phe
370      485      490      495
373 Glu Gly Trp Met Arg Ser Thr Glu Ser Ser Tyr Lys Asp Lys Phe Arg
374      500      505      510
377 Gly Trp Val Gly Phe Ser Val Pro Val Ser His Arg Ile Thr Ala Gly
378      515      520      525

```

VERIFICATION SUMMARY

PATENT APPLICATION: US/09/674,824

DATE: 05/08/2001

TIME: 11:54:20

Input Set : A:\ES.txt

Output Set: N:\CRF3\05082001\I674824.raw

L:11 M:271 C: Current Filing Date differs, Replaced Current Filing Date